WHAT IS CLAIMED IS:

1. A polarization transformer operable to reorient polarization components of an incident optical signal, the polarization transformer comprising:

a continuously adjustable retarder operable to provide reset-free operation and continuous control of a polarization state of the optical signal; and

a limited-range adjustable retarder located in optical communication with the continuously adjustable retarder and operable to provide limited-range control of the polarization state of the optical signal.

2. The polarization transformer of claim 1 wherein the continuously adjustable retarder includes a wave plate.

3. The polarization transformer of claim 2 wherein the wave plate is a half-wave plate.

4. The polarization transformer of claim 2 wherein the continuously adjustable retarder includes:

a motorized rotatable mount coupled to the wave plate, wherein the motorized rotatable mount is operable to continuously rotate the wave plate about an axis normal to a surface of the wave plate.

5. The polarization transformer of claim 1 wherein the continuously adjustable retarder is located with respect to the limited-range adjustable retarder so as to receive the optical signal from an optical source and to transfer a transformed optical signal the to the limited-range adjustable retarder.

6. The polarization transformer of claim 1 wherein the limited-range adjustable retarder includes a liquid crystal retarder having at least one liquid crystal cell.

7. The polarization transformer of claim 6 wherein the at least one liquid crystal cell includes:

a first substantially transparent window;

a second substantially transparent window; and

a liquid crystal medium located between the first substantially transparent window and the second substantially transparent window.

8. The polarization transformer of claim 6 wherein the liquid crystal retarder includes a plurality of electrodes for applying a voltage to the at least one liquid crystal cell.

9. The polarization transformer of claim 6 wherein the liquid crystal cell includes a liquid crystal material.

10. The polarization transformer of claim 9 wherein the liquid crystal material is a nematic liquid crystal material.

11. The polarization transformer of claim 9 wherein the liquid crystal material is a ferroelectric liquid crystal material.

12. The polarization transformer of claim 11 wherein the liquid crystal material is a fluorinated ferroelectric liquid crystal material.

13. The polarization transformer of claim 6 wherein the at least one liquid crystal cell includes a first liquid crystal cell, a second liquid crystal cell, and a third liquid crystal cell.

14. The polarization transformer of claim 13 wherein the first liquid crystal cell and the third liquid crystal cell transform the polarization state of the optical signal in a first direction, and wherein the second liquid crystal cell transforms the polarization state of the optical signal in a second direction.

15. The polarization transformer of claim 6 wherein the limited-range adjustable retarder includes:

a second liquid crystal retarder having at least one liquid crystal cell and being located in optical communication with the liquid crystal retarder; and

a quarter-wave plate located between and in optical communication with the liquid crystal retarder and the second liquid crystal retarder.

16. The polarization transformer of claim 1 wherein the limited-range adjustable retarder includes at least one of a lithium niobate crystal, a lanthanum

modified lead zirconate titanate (PLZT) material, and a mechanically stressed optical fiber.

17. The polarization transformer of claim 1 wherein the limited-range adjustable retarder is located with respect to the continuously adjustable retarder so as to receive the optical signal from an optical source and to transfer a transformed optical signal to the continuously adjustable retarder.

18. The polarization transformer of claim 1 wherein the limited-range adjustable retarder has a first response time and the continuously adjustable retarder has a second response time, the first response time being shorter than the second response time.

19. The polarization transformer of claim 1 further comprising:

a controller operable to provide control signals to the limited-range adjustable retarder and to the continuously adjustable retarder.

20. A system for compensating for polarization mode dispersion in an optical signal, the system comprising:

a polarization transformer operable to reorient polarization components of an incident optical signal, the polarization transformer including:

a continuously adjustable retarder operable to provide reset-free operation and continuous control of a polarization state of the optical signal; and

a limited-range adjustable retarder located in optical communication with the continuously adjustable retarder and operable to provide limited-range control of the polarization state of the optical signal;

a delay system operable to adjust the relative delay between a first reoriented polarization component of the optical signal and a second reoriented polarization component of the optical signal; and

a controller coupled to the polarization transformer and operable to provide control signals to the limited-range adjustable retarder and the continuously adjustable retarder.

21. The system of claim 20 wherein the continuously adjustable retarder includes a wave plate.

22. The system of claim 21 wherein the wave plate is a half-wave plate.

23. The system of claim 21 wherein the continuously adjustable retarder includes:

a motorized rotatable mount coupled to the wave plate, wherein the motorized rotatable mount is operable to continuously rotate the wave plate about an axis normal to a surface of the wave plate.

24. The system of claim 20 wherein the limited-range adjustable retarder includes a liquid crystal retarder having at least one liquid crystal cell.

25. The system of claim 24 wherein the liquid crystal retarder includes a plurality of electrodes for applying a voltage to the at least one liquid crystal cell.

26. The system of claim 24 wherein the liquid crystal cell includes at least one of a nematic liquid crystal material, a ferroelectric liquid crystal material, and a fluorinated liquid crystal material.

27. The system of claim 24 wherein the limited-range adjustable retarder includes:

a second liquid crystal retarder having at least one liquid crystal cell and being located in optical communication with the liquid crystal retarder; and

a quarter-wave plate located between and in optical communication with the liquid crystal retarder and the second liquid crystal retarder.

28. The system of claim 20 wherein the limited-range adjustable retarder includes at least one of a lithium niobate crystal, a lanthanum modified lead zirconate titanate (PLZT) material, and a mechanically stressed optical fiber.

29. The system of claim 20 wherein the limited-range adjustable retarder has a first response time and the continuously adjustable retarder has a second response time, the first response time being shorter than the second response time.

30. The system of claim 20 wherein the delay system is located with respect to the polarization transformer so as to receive the first reoriented polarization component of the optical signal and the second reoriented polarization component of the optical signal from the polarization transformer.

31. The system of claim 20 wherein the delay system includes a polarization maintaining optical fiber.

32. The system of claim 20 wherein the delay system includes at least one of mechanically stressed optical fiber and a heated optical fiber.

33. The system of claim 20 further comprising:
a detector coupled to the controller; and
an optical tap operable to provide at least a portion of the optical signal to the detector.

34. The system of claim 33 wherein the optical tap includes a beamsplitter.

35. The system of claim 33 wherein the detector includes:
a photodetector; and
an error signal circuit.

36. The system of claim 20 wherein the controller includes:
at least one amplifier for amplifying and detecting an error signal related to the intensity of the optical signal; and
at least one voltage source coupled to receive the error signal and to provide a voltage based on the error signal to the polarization transformer.

37. The system of claim 36 wherein the at least one amplifier is a lock-in amplifier.